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ABSTRACT

This paper describes the operations of the Nuclear Safety Analysis Center. Established soon after an accident at the Three Mile Island nuclear power plant near Harrisburg, Pennsylvania, its efforts were initially directed towards a detailed analysis of the accident. Continuing functions include: (1) the analysis of generic nuclear safety issues, (2) serving as a repository for information resulting from the effort to restore the Three Mile Island plant, and (3) serving as a clearinghouse for technical information related to the safety and licensing of nuclear power plants. Two operation support systems are explained: the NOTEPAD computer-conferencing system, which provides information exchange among organizations concerned with nuclear plant operations; and a records management scheme built around a microfilmed document collection and a ZYTRON computer system for online information retrieval. A flow chart of the computer system, a sample database entry, and a list of subject-specific files available to NOTEPAD users are attached. (SW)

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INFORMATION SERVICES AT THE NUCLEAR SAFETY ANALYSIS CENTER

PRESENTED BY

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AT THE 9TH MID-YEAR MEETING
AMERICAN SOCIETY FOR INFORMATION SCIENCE

MAY, 1980

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The Nuclear Safety Analysis Center (NSAC) was established at the Electric Power Research Institute soon after the accident at the Three Mile Island nuclear plant. Initially, most of our efforts went into an analysis of that accident, and we published a comprehensive second-by-second description and analysis of the event. We followed that with a series of "what if" studies. What if the core had melted - would it have breached the reactor containment: Would radioactivity have been released to the environment, etc? We continue to analyze generic nuclear safety issues. We also maintain a repository for much of the data coming from the effort to clean up and restore the TMI plant. We serve as a clearinghouse for technical information related to the safety and licensing of nuclear plants.

To help us perform this clearinghouse function, we have the NOTEPAD computer-conferencing system, and to support the other areas mentioned above, we have developed a records management scheme built around microfilm and a ZYTRON computer system. By "records" I mean reports, letters, memos, hearing transcripts, tables of data, etc., mainly related to the TMI accident and cleanup or to nuclear safety in general.

Figure 1 shows the flow of these records through the system. A working copy and an archival-quality copy of the original document are made on microfilm and the original goes on to be indexed and summarized. We use nuclear engineering graduate students from U.C. Berkeley for this. Figure 2 shows the results of their work. The form in the figure starts with a film reference number - the microfilm cartridge and beginning frame number on the film of the copy. Then comes the type of record, title, date of publication and publication number if applicable (e.g., NUREG-0161). The publication and research project number fields are used internally by us. These are followed by the author's name, corporate affiliation, and the recipient (e.g., if the document were a letter to somebody). We have a list of subject areas and key words useful in searching the database for retrieval of this or related documents. Actually, all the fields, except the remarks which

summarize the document, are searchable.

We prefer to do most of the searches of the database ourselves, i.e., have a nuclear utility, or someone involved in the TMI cleanup, call us with a request for information. Figure 1 shows that it's also possible for them to dial up our ZYTRON computer directly and do the search themselves, but we have only 2 dedicated phone lines and it <u>is</u> a microcomputer, poorly suited for this type of usage. So, periodically, we dump the database onto a magnetic tape, load the tape into a mainframe computer on the National CSS network, and invite remote users to use our account with NCSS to dial into their network and use their software (the NOMAD database management package) for searches. What they get then, is a list of documents indexed by descriptors which satisfy the search criteria, i.e., for each document they get the information shown in Figure 2. If they want the entire document, they can go to the originator or call and give us the film reference number, and we will generate a hard copy for them from the microfilm.

The other system I'd like to discuss is a computer-conferencing system called NOTEPAD. It allows information exchange among the utilities, NSAC, and other organizations concerned with nuclear plant operations. Designated users in the organizations dial up, through TYMNET, a computer in Palo Alto. The nature of the information available to them is shown in Figure 3. It is stored in subject-specific files and a user is notified when new information has been placed in a file, since his last log-in, by an asterisk as shown in the figure.

The information may be private - one individual writes another a note which can be read only by those two - or it can be public. For example, one utility asks what the others are doing to satisfy some new regulatory requirement and the responses start immediately and continue over several days. Thus, one message gets disseminated directly to 200 individuals, at some 50 different locations, who in turn propagate it through their organizations.

Not only is the information available on a timely, widespread basis, but it remains stored in the computer for several months where it is retrievable on a full-text basis or by date or by author. The information remains secure since it is encrypted and since access to it requires three different passwords, one of which is user-supplied at his initial log-in. (Since only he knows this password, only he can access a private message addressed to him.)

The system is used also to coordinate activities among NSAC staff and several contractors involved in a large scale program to evaluate operational and reliability data from all operating nuclear plants.

Another application now under development will demonstrate the system's conferencing capability in a realistic simulation of an accident like the one at TMI. In such a situation, local telephone lines at a typical plant site become saturated rather quickly and can't be counted on. So an alternative connection, between the national trunk lines and a computer terminal at the site, must be established. The possibilities include microwave transmission, power line carriers, and phase-modulated AM radio signals. The AM transmission and reception at the site, could occur at the same frequency used by a local radio station, but the information would be separable from the rock and roll because of the difference in phase between the two signals.

This would offer a more dependable way for the plant staff to get into the NOTEPAD network. Once in the system, in this realistic post-accident scenario, they will get requests for information from their management and from other utilities, from the Nuclear Regulatory Commission, from the govenor's office, etc. What are the current system parameters? What is the probability of damage to the core or radioactive releases? Should we evacuate pregnant women near the site? The operators will also be able to solicit help from the plant manufacturer, NSAC staff, and other contacts in the nuclear industry.

This demonstration/test of the system would occur on a Saturday morning, say - assuming we can find plant operating personnel, governor's aides, NRC staff and others willing to give up a Saturday morning. The goal would be to illustrate how NOTEPAD could be used to alleviate some of the communications problems which arose at TMI and allow the exchange of information which would be broadly disseminated on a real-time basis and retrievable for an indefinite period.

FIGURE 1

THE ZYTRON SYSTEM USES MICROFILM AND A MICROCUMPUTER

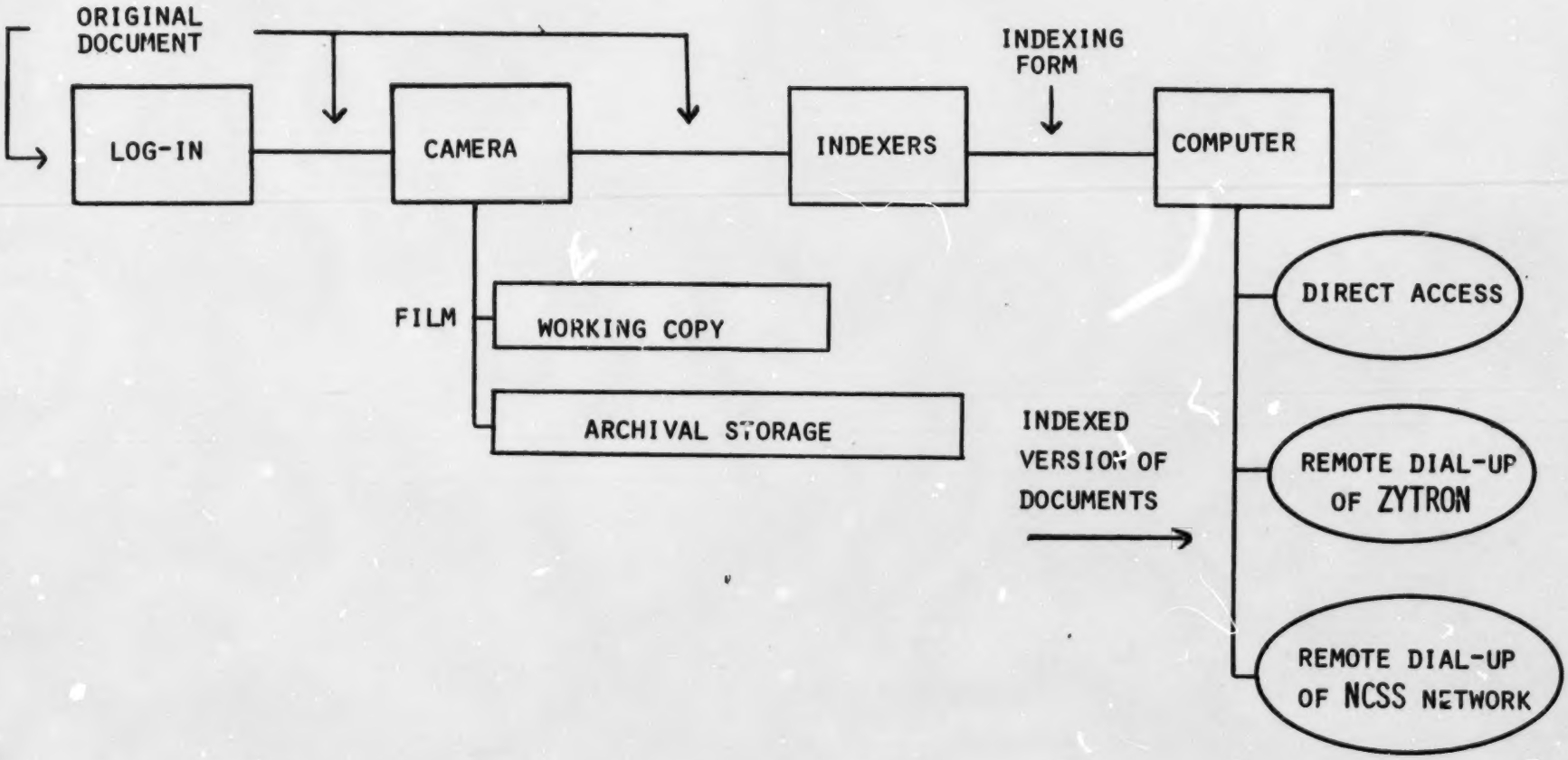

FIGURE 2

ZYTRON DOCUMENT ENTRY FORM

FILM REFERENCE

1	0	0	6	2	7	3	5

1 RTYPE	Report
2 TITLE	Three Mile Island - A Report to the Commissioners and to the Public - Vol. 1
3 DATE	800115
4 DOCNO	
5 PUB	
6 RPNO	
7 ORIG	Rogovin M., Frampton GT
8 CORP	Nuclear Regulatory Commission
9 RCVR	
10 SUBJ	Investigation of TMI accident
11 KEYS	TMI, accident chronology, government investigation, Rogovin report
12 MISC	183 pages, 4 figures, 2 tables
14 LOC	microfilm = 10062735; hard copy = drawer B
13 REM	This is the "Rogovin Report" - the report of a special inquiry convened by the NRC to determine what happened at TMI and why, to assess the actions of utility and NRC personnel before and during the accident, and to identify deficiencies in the system and areas where further investigation might be warranted. See also Vol. 2 under the same title.

FIGURE 3

THE INFORMATION EXCHANGED DEALS WITH NUCLEAR SAFETY AND LICENSING ISSUES.

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